



**CITY OF NEWPORT  
DEPARTMENT OF UTILITIES  
WATER DIVISION**

**WATER SUPPLY SYSTEM  
MANAGEMENT PLAN**

**EXECUTIVE SUMMARY**

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## EXECUTIVE SUMMARY

This Water Supply System Management Plan (WSSMP) has been prepared as required under Rhode Island General Laws 46-15.3, as amended and titled “The Water Supply System Management Planning Act” (Act). The legislative authority to effectuate the goals and policies of this Act has been conferred to the Rhode Island Water Resources Board (RIWRB). To this end, the RIWRB has promulgated the Rules and Regulations for Water Supply System Management Planning, last revised in October 2002, as amended to implement the provisions of the Act.

### *Introduction*

The Newport Water Division (NWD), as a water purveyor supplying over 50 million gallons (MG) of water per year, is responsible for the preparation and adoption of a WSSMP. It is also required that the NWD update this WSSMP periodically, every five years, or as otherwise stipulated in the Regulations. This document is the 2013 update of the current WSSMP and has been prepared to provide the proper framework to promote effective and efficient conservation, development, utilization, and protection of the natural surface water resources of the State as utilized by the NWD. Further, the overall goals are consistent with State Guide Plan Element 721, Rhode Island Water 2030. Its purpose is to outline the objectives of the Water Supply System Management Planning process for the NWD water distribution system, and to serve as a guide to employ the proper decision making processes.

### *Background*

The original water works in Newport started in 1876. The Newport Water Works Company was incorporated in 1881, and was succeeded by the Newport Water Corporation in 1929. Since 1936, the City of Newport has owned and operated the system. The City’s legal authority to own and operate the system is stated in the City Charter.

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The NWD is a division of the City of Newport's Department of Utilities and it is responsible for the operation and maintenance of the system. The NWD operates as an enterprise fund and is responsible for its own financial accounting independent of the overall City budget. Newport Water is regulated by the Rhode Island Public Utilities Commission.

The NWD draws its water supply from nine surface reservoirs located throughout Aquidneck Island and in the neighboring towns of Tiverton and Little Compton. Raw water is treated at the two water treatment facilities – the Station No. 1 Water Treatment Plant (WTP) on Bliss Mine Road in Newport and the Lawton Valley WTP off of West Main Road in Portsmouth. The NWD maintains a distribution system which services all of Newport, much of Middletown, and a small section of Portsmouth. In addition, the NWD provides water on a wholesale basis to the Portsmouth Water & Fire District (PWFD) and serves the Naval Station Newport (NSN), a bulk retail customer.

### ***General System Description***

The NWD water system consists of a complex network of nine surface water reservoirs, two treatment plants, four finished water storage facilities, in addition to clearwells at the treatment plants, booster pump stations for both raw and treated water, and close to 200 miles of distribution piping. The system serves approximately 14,500 retail customers across Aquidneck Island, including 10 connections with the Naval Station Newport, and sells water to the Portsmouth Water and Fire District (PWFD) on a wholesale basis.

Source of supply is obtained from nine (9) surface water reservoirs. The reservoirs are located in Newport, Portsmouth, Middletown, Tiverton, and Little Compton. More information about each reservoir is included in Table 1. Collectively, these reservoirs have a total capacity of approximately 4.3 billion gallons, with 3.9 billion usable gallons. The combined watershed area is almost 20 square miles, and only about 1 square mile is within the City of Newport.



**Table 1. Summary of Surface Water Supplies**

<b>Reservoir</b>	<b>Location</b>	<b>Surface Area (acres)</b>	<b>Watershed Area (sq. miles)</b>	<b>Storage Capacity (MG)</b>	<b>Usable Storage (MG)</b>
Watson Reservoir	Little Compton	371.0	3.34	1,755.1	1,677.4
Nonquit Pond	Tiverton	196.0	6.88	565.3	403.0
St. Mary's Pond	Portsmouth	102.6	0.75	205.5	189.0
Sisson Pond	Portsmouth	60.5	0.70	117.0	117.0
Lawton Valley Reservoir	Portsmouth	82.3	1.23	421.6	421.6
North & South Easton Ponds	Newport	260.2	4.13	685.1	650.8
Gardiner and Paradise Ponds	Middletown	134.0	2.95*	526.2	458.9

\* Includes watershed area of Maidford River, which can be diverted into Paradise and Gardiner Ponds.

In 2004, the City completed a Water Treatment Plant Compliance Evaluation to assess the physical condition of both treatment plants and their ability to meet current and future drinking water regulations. Of particular concern was the treatment plants' inability to comply with new regulations for total trihalomethanes (TTHMs). Also, the Water Treatment Plant Compliance Evaluation determined that the Lawton Valley WTP (circa 1942) was beyond its useful life and could not be cost-effectively upgraded. The Station No. 1 WTP needed upgrading to restore its reliable treatment capacity to 9 MGD, as it could only reliably treat up to 6 MGD without compromising finished water quality.

The Lawton Valley WTP is being replaced with a new treatment plant, and the Station No. 1 WTP is currently undergoing extensive upgrades. This work is being performed to comply with the requirements of a 2008 Consent Agreement between the City of Newport and the RI Department of Health (RIDOH) that states that the NWD will eliminate the release of TTHMs into the water system by December 31, 2014. Construction is scheduled so that both facilities are operational by December 2014.



Once complete, both treatment plants will have the following general treatment processes:

- Pre-oxidation with chlorine dioxide
- Clarification by dissolved air flotation (DAF)
- Granular media filtration
- Advanced treatment with Granular Activated Carbon (GAC)
- Disinfection with chlorine
- pH Adjustment

Raw water is delivered to the treatment plants through a network of raw water transmission mains and pump stations. Finished water pump stations and transmission mains are also located throughout the system. Table 2 provides a summary of both raw water and finished water pump stations in the system, including the infrastructure components they serve, the number and type of pumps used, and their capacities.



**Table 2. Summary of NWD Pumping Stations**

Pump Station	From	To	Pump Type	Pump Capacity
<i>Raw Water Pump Stations</i>				
Sakonnet River Pumping Station	Nonquit Pond, Watson Reservoir	Lawton Valley WTP, St. Mary's Pond, Bailey Brook	Horizontal, constant speed	2 @ 8 MGD 1 @ 6 MGD
St. Mary's Pumping Station	St. Mary's Pond	Lawton Valley WTP	Vertical Turbine, constant speed	1 @ 5 MGD 1 @ 7.5 MGD
Lawton Valley Low Lift Pump Station	Lawton Valley Reservoir	Lawton Valley WTP	Horizontal, constant speed	1 @ 2 MGD 1 @ 4 MGD
Paradise Pumping Station	Paradise and Gardiner Ponds	Station 1 WTP	Horizontal, variable speed	2 @ 4.5 MGD
Station 1 Low Lift Pump Station	North and South Easton Ponds	Station 1 WTP	Vertical Turbine, variable speed	2 @ 2 MGD 2 @ 4 MGD
<i>Finished Water Pump Stations</i>				
Lawton Valley Finished Water Pump Station*	Lawton Valley WTP Clearwells	Lawton Valley Standpipes	Vertical, constant speed	3 @ 6 MGD
Station 1 Finished Water Pump Station	Station No. 1 Clearwells	Distribution System, Reservoir Road Tank	Horizontal, constant and variable speed	3 @ 3 MGD 1 @ 6 MGD
Station 1 Finished Water Pump Station	Station No. 1 Clearwells	Lawton Valley WTP	Horizontal, constant speed	2 @ 2.5 MGD (1 duty, 1 standby)
Forest Avenue Pumping Station	Medium Pressure Zone	High Pressure Zone	Horizontal, constant speed	2 @ 1 MGD

\* A third 6 MGD pump will be added to the station and the station will pump finished water to the proposed 1.75 MG elevated tank in addition to the existing 2 MG standpipe.

There are four finished water storage tanks in the system, in addition to the clearwells at the treatment plants. A 1.0 MG interim storage tank at the Lawton Valley WTP site was constructed in 2012, but will be removed upon the construction of a new, permanent 1.75 MG elevated steel storage tank. This tank will be constructed in 2014.



**Table 3. Finished Water Storage Facilities**

<b>Storage Facility</b>	<b>Service Area</b>	<b>Total Capacity (MG)</b>	<b>Overflow Elevation</b>	<b>Bottom Elevation</b>	<b>Depth (feet)</b>	<b>Volume (gal/ft.)</b>
Reservoir Road Tank	Low Pressure Zone	3.0	175	135	40	75,000
Lawton Valley Standpipe #1	Medium Pressure Zone	2.0	251	181	70	28,570
Lawton Valley Interim Tank*	PWFD & Medium Pressure Zone	1.0	201	168.74	32.25	31,000
Gouliart Lane Standpipe	High Pressure Zone	1.5	333.5	263.5	70	21,430
Newport WTP Clearwell	Low & Medium Zones	0.2	16.0	-2.5	12.6	16,430

\* The 1.0 MG Lawton Valley interim tank was constructed in 2012. A permanent 1.75 MG standpipe will be constructed at Lawton Valley in 2014 and the interim tank will be removed.

The transmission and distribution system consists of approximately 200 miles of active, in-service water mains. The service area population is estimated to be 40,000 people. This includes the entire population of Newport, approximately 75% of the population of Middletown, and a very small portion of Portsmouth's population.

There are two working interconnections with the PWFD, which is a neighboring water supply that serves a large portion of the Town of Portsmouth outside of the NWD service area. Currently, the PWFD obtains all of its water supply from the NWD. The primary interconnection, located at the Lawton Valley site, currently draws water from the existing standpipe to supply the PWFD system. The other interconnection is located at Mitchell Lane and is for emergency purposes only. Wholesale water sales are made to the PWFD through an agreement and contract that went into effect in May 1983 but expired on December 31, 1995. The terms of this agreement, except for billing rates, are still followed by both NWD and PWFD despite the expiration of the agreement. The agreement requires that NWD provide up to 450 MG of potable water to the PWFD each year and 2.25 MG on a maximum day. It also requires that the PWFD purchase at least 500,000 gallons each day with a minimum annual purchase of 191 MG.

Total system production for Calendar Year 2012 year was approximately 2,275 MG, while total demand in the NWD system was approximately 2,070 MG over this same time period.



Approximately 398.36 MG was sold to the PWFD in Fiscal Year 2012. Each of these estimates is somewhat lower than in previous years.

Average Day Demand (ADD) for Calendar Year 2012 was estimated to be 5.59 MGD. Given the estimated service area population, the current generalized per capita system demand was estimated to be 139.86 gallons per capita per day (GPCD). Residential average annual water use is estimated to be approximately 43.4 GPCD for Fiscal Year 2013. The ADD was estimated to be 5.83 MGD in Fiscal Year 2012, while the Maximum Day Demand (MDD) was estimated to be 9.7 MGD. The MDD to ADD peaking factor was 1.67 for Fiscal Year 2012, which is comparable to previous years.

There were approximately 14,480 active accounts in Fiscal Year 2012. Twenty-nine (29) customers currently qualify as major users, with a historical annual demand of at least 3 MG. Salve Regina, the Newport Housing Authority, and NETC are typically the largest customers in the system. The service connections in Fiscal Year 2012 were as follows:

- Residential 12,941
- Commercial: 1,430
- Governmental: 93
- Other: 16
- Total: 14,480

The NWD began a meter radio read conversion program in 2008, converting all meters in the system to radio-read meters. This program is projected for completion by January 1, 2014. Essentially the entire system is now metered, except for a relatively small number of dedicated fire services that are used only during emergency events. This program allows the NWD to read all meters at least quarterly, while large meters are read monthly via the radio read system. The NWD's goal is to institute monthly meter reading throughout the entire system within five years.

As indicated in the NWD's Demand Management Strategy, all meters in the system are generally less than five years old as a result of the meter retrofit program. Meters 2-inches in size and smaller have an anticipated useful life of at least 15 years, and the NWD will begin testing and replacing meters, as necessary, at that time. These comprise all but 100 meters active in the system. Large meters are tested more frequently based on size, according to AWWA guidelines.





Despite its age, the system does not have a lot of major deficiencies and many that were previously identified have been addressed by the NWD. These include repairs that were recently completed to the Easton Pond Dam, addressing storm-damaged structural deficiencies along the north and west embankments of the dam; various upgrades to tanks, pump stations, and other infrastructure components; and periodic water main upgrades. The NWD is also undergoing a major capital improvement project, performing substantial upgrades to both of its treatment plants. Construction began in October 2012 and facilities are scheduled to be in operation by December 2014. Once complete, the treatment plants will have a combined capacity of 16 MGD and will comply with the 2008 Consent Agreement between the NWD and the RI Department of Health.

### ***Water Quality Protection Component***

The Water Quality Protection Plan (WQPP), originally prepared in 1989, was most recently updated in June 2010 and was incorporated into the WSSMP. The WQPP identified that water in the watershed is generally of good quality but that the watershed is at a significant pollution risk due to land development and commercial uses. Thirteen response actions were identified, which the NWD will continue to implement to maintain good water quality in the reservoirs. They are:

1. Land acquisition and ownership;
2. Updating the GIS database;
3. Sampling, trend analysis, modeling, and research;
4. Input on State regulations;
5. Land use, land development, and construction standards;
6. Public education and outreach;
7. Sanitary wastewater and stormwater management improvements;
8. Improvements to minimize impacts from transportation infrastructure;
9. Improved practices with herbicides, pesticides, and fertilizer usage;
10. Minimizing impacts from animal populations;
11. Minimizing impacts from uncontrolled releases of hazardous materials;
12. Minimizing impacts from commercial and industrial activities; and
13. Implementation of strategies toward improving water quality of impaired waters.



The Source Water Assessment, originally prepared in 2003 by the University of Rhode Island Cooperative Extension and updated by the NWD in May 2010, was also reviewed and incorporated into the WSSMP along with updates to reflect current conditions in the watershed. North and South Easton Ponds, Paradise Pond, and Lawton Valley Reservoir were identified as being at high risk based on evaluation of the six risk indicators established for surface water supplies. The other reservoirs were identified as being at moderate or low risk. In general, the risks to the reservoirs have not worsened since the original Source Water Assessment in 2003 and the NWD has taken several actions, including those listed previously, to protect water quality in the reservoirs and their watersheds.

#### ***Anticipated Future Demands***

The projected water demands in the NWD system for the 5-year and 20-year planning periods were estimated through consultation with NWD staff as well as from data provided in an August 2009 technical memorandum prepared by Camp Dresser and McKee, entitled Review of Demands and Supply. The intent of this memorandum was to project future demands to establish the design capacity of the two water treatment plants in preparation for their reconstruction. The memorandum provided estimates of the anticipated average day demand (ADD) and maximum day demand (MDD) in 2015 for a 5-year planning projection and in 2030 for a 20-year planning projection. Despite a downward trend in water use in recent years, it is recognized that water use in the system is volatile based on a number of factors, including economic conditions. In light of this, predicting a continued reduction in water use for future demands is likely not prudent from a water supply planning perspective. Therefore, the demands projected by CDM were used for the 5-year and 20-year projections for this WSSMP, as summarized in Table 4.

**Table 4. Anticipated Future Demands**

	<b>5-Year Period (2018) (MGD)</b>	<b>20-Year Period (2033) (MGD)</b>
<b>ADD</b>	<b>7.00-7.44</b>	<b>7.50-7.96</b>
<b>MDD</b>	<b>12.40-13.20</b>	<b>13.30-14.10</b>



Future demands are presented in ranges, which are calculated based on 15% to 20% unaccounted water. The State's goal for unaccounted water use is 15% (with a goal of 10% established for leakage), while 20% unaccounted water provides a somewhat more conservative estimate. The combined treatment capacity of the two treatment plants is 16 MGD, which can meet the anticipated MDD in a 20-year planning horizon.

#### *Available Water*

The NWD recently completed bathymetric surveys and performed a Safe Yield Study of all nine reservoirs, the findings of which were summarized in a report entitled Reservoirs Safe Yield Analysis (amended in March 2011). The yield from each reservoir was estimated during average hydrologic conditions, a drought with a 20-year recurrence interval, and the drought of record (May 1964 to April 1966). Table 5 summarizes the estimated yields from the reservoirs under each of these conditions.

**Table 5. Estimated Yields from NWD Reservoirs**

Reservoir	Yield (MGD)		
	Drought of Record	20-year Recurrence	Average Hydrologic Conditions
North & South Easton Ponds	1.799	2.498	3.198
Paradise-Gardiner Ponds	1.313	1.720	2.292
Lawton Valley Reservoir	0.679	0.788	0.977
Sisson Pond	0.322	0.443	0.554
St. Mary's Reservoir	0.342	0.466	0.617
Nonquit Pond	3.019	2.765	4.665
Watson Reservoir	1.924	1.800	2.300
<b>Total</b>	<b>9.398</b>	<b>10.480</b>	<b>14.603</b>

Current and projected ADD in the NWD system is below the total system yield estimated for each of these hydrologic conditions. The current and projected MDD can also be met under average



hydrologic conditions. During periods of drought, demand management strategies shall be implemented so that water use remains below these safe yields.

### ***Supply Management***

The NWD does not currently have any inactive or abandoned water supply sources in their system. All nine (9) of their surface water reservoirs are actively used for storage and/or distribution. Improvements have been implemented over the years to increase supply capacity without developing new sources, but the NWD maintains land holdings in others area for potential future development, should this someday be a consideration. However, at this time it does not appear that alternative sources of supply or supply augmentation studies need to be investigated or implemented.

### ***Demand Management***

The *Rules and Procedures Governing the Water Use and Efficiency Act for Major Public Water Suppliers* (Act), adopted May 16, 2011 established efficient water use targets for major public water suppliers, which includes the NWD. It also required that a Water Efficiency and Demand Management Strategy (DMS) be prepared and submitted to the Rhode Island Water Resources Board (RIWRB) for review and approval by August 1, 2012.

The NWD submitted its Demand Management Strategy to the RIWRB in August 2012 and amended it in June 2013, which demonstrated that the NWD is in general compliance with several requirements of the Act. This includes the residential average annual water use goal of 65 gallons per capita per day (GPCD), which was estimated to be 47 GPCD for Fiscal Year 2012. The NWD estimates non-billed water from various uses, such as firefighting and hydrant flushing, and meets the quarterly metering and billing requirements stipulated in the Act. The DMS also outlined strategies that the NWD uses to promote efficient indoor and outdoor water, such as:

- Educational and informational programs for its customers, including providing “Preventing Wasted Water” pamphlets and a “Water Wheel” pamphlet that depicts typical water use by fixture;



- Additional educational information regarding efficient water use provided on the Newport Department of Utilities website, in bill stuffers, and on the annual Consumer Confidence Report;
- Complimentary indoor conservation/audit kits, which include a flow meter, flush volume calculator, drip gauge, and leak detection kit; and
- Complimentary outdoor conservation kits that include a soil moisture meter, rain gauge, and hose nozzle and timer.

Leakage was estimated to be 11.31% in Fiscal Year 2012, slightly above the 10% goal. The NWD completed a leak detection survey with an outside contractor during Fiscal Years 2011 and 2012, which resulted in the identification of 19 leaks and approximately 175,000 gpd in water losses. The survey was completed in September 2011 and the leaks have since been repaired. The estimated leakage rate for Fiscal Year 2012 includes time before many of these leaks were discovered and repaired, and current leakage is quite possibly lower as a result of these repairs. Another leak detection survey is anticipated for Fiscal Year 2014, but NWD staff will continue to periodically perform in-house leak-detection surveys with its own equipment until then.

### ***System Management***

The major goals of system management include the following:

- Maintaining non-account water use to below 15% of total system demand, in accordance with State Guide Plan Element 721;
- Reducing leakage to below 10% of system demand;
- Establishing a preventive maintenance program; and,
- Maintaining compliance with the applicable requirements of the *Rules and Procedures Governing the Water Use and Efficiency Act for Major Public Water Suppliers*.

Leak detection surveys have historically been performed throughout the NWD system by outside consultants, most recently in 2011. A total of 19 leaks, yielding approximately 175,000 gpd in wasted water, were identified and subsequently repaired by NWD staff following this survey. The leakage rate was estimated to be approximately 11.3% in Fiscal Year 2012, but leaks have subsequently been repaired and current leakage may be less. The next leak detection survey is



scheduled for Fiscal Year 2014. The NWD also periodically monitors for leaks with their own equipment in between these more extensive leak detection surveys.

The NWD also performs sound preventive maintenance (PM) practices on the major supply, treatment, storage, and distribution components of the water system. Routine inspections are performed by NWD staff while detailed inspections of some components, such as storage tanks, are performed by contractors hired by the NWD.

The NWD is in general compliance with the *Rules and Procedures Governing the Water Use and Efficiency Act for Major Public Water Suppliers*.

### ***Emergency and Drought Management***

An updated Emergency Management Plan was prepared as part of this WSSMP, which generally establishes the following:

- Responsibilities and authority within the NWD and City of Newport for responding to most probable emergencies;
- Most probable causes for emergencies and their potential impacts to the system;
- System components that are vulnerable to damage or incapacitation based on the most likely causes for emergency; and
- Specific tasks for carrying out functional and constructive solutions based on a review of the potential emergencies and the associated system risks.

Drought is one specific type of emergency that is treated separately, as it can impact the system over an extended period of time. The NWD monitors drought conditions in its own supply reservoirs and assigns drought conditions, as follows:

- **Watch:** Reservoirs on Aquidneck Island are less than 50% capacity and Nonquit Pond/Watson Reservoir are less than 75% capacity;
- **Warning:** Reservoirs on Aquidneck Island are less than 40% capacity and Nonquit Pond/Watson Reservoir are less than 60% capacity; and



- **Emergency:** Reservoirs on Aquidneck Island are less than 30% capacity and Nonquit Pond/Watson Reservoir are less than 40% capacity.

The NWD has historically imposed water use restrictions as a way of reducing demand in response to these drought conditions. Odd/even outdoor water use restrictions are not typically required during normal periods, but have been imposed during drought conditions. These restrictions start off on a voluntary basis as Drought **Watch** conditions approach but would transition to mandatory as drought conditions worsen. Violators are warned, while repeat violations might result in water shut off. Mandatory termination of outdoor and other nonessential water uses are imposed during Drought **Emergency** conditions.

### ***Implementation and Financial Management***

While the water system is considered to be in good condition with few deficiencies, infrastructure maintenance, rehabilitation, and replacement is inevitable. Implementation of these system improvements is through the NWD's 5-year capital improvement plan (CIP), which is reviewed and updated annually as part of the budgeting process for the Newport Water Fund, per City Ordinance. The Water Fund and all water rates are subject to review and approval by the RIPUC.

Most of the projects included in the CIP are paid out of the Water Fund through money allocated by water use rates. The major exceptions to this are the projects related to the water treatment plant improvements project. These include the actual design-build contract as well as professional services performed by the City Advisor and legal and financial services. These projects are being financed through a Drinking Water State Revolving Fund (SRF) loan from the R.I. Clean Water Finance Agency which will continue for Fiscal Years 2014 and 2015. They represent approximately 65% of the total capital improvements anticipated in the next five years. Servicing the debt from this loan will follow for several years but it is not paid out of the capital improvement portion of the Water Fund. System operation and maintenance costs, capital costs, and debt payments are made through water use rates as well.

In April 2011, the NWD submitted a General Water Rate Filing with the RIPUC (Docket 4243) to increase rates on a multi-year plan. The basis of this rate increase was for debt service, capital projects, and operation and maintenance expenses as the City was about to embark on this extensive capital improvements plan. This filing increased water rates by approximately 22.5%



for Fiscal Year 2012 and established further increases in water rates for Fiscal Years 2013 – 2015 that were subject to change based on future compliance filings.

In September 2012 the NWD submitted a Cost of Service Filing with the RIPUC (Docket 4355) as Phase II of the multi-year rate plan initiated in April 2011. The rate increase was sought to service debt associated with the water treatment plant capital improvements. New water rates went into effect in accordance with the Order for Docket 4355 on May 1, 2013. Additional information regarding these rate filings, as well as the current rate schedule, is available on the NWD webpage.

### ***Coordination***

This WSSMP was developed in conjunction with reviews of the Newport Comprehensive Land Use Plan and the Comprehensive Plans for the Towns of Portsmouth, Middletown, Tiverton, and Little Compton. The planning department from each community was also contacted in an attempt to determine whether any recent changes have been made to these plans that may impact this WSSMP. The NWD maintains close coordination with each community as well as the PWFD, its neighboring water supplier and their wholesale customer.

